

# EXHIBIT E



RECEIVED NOV - 4 2003

Jacobs Civil Inc.  
Two Center Plaza  
Boston, Massachusetts 02108-1906 U.S.A.  
1.617.742.8060 Fax 1.617.742.8830

October 31, 2003

Jon D'Allessandro, President  
D'Allessandro Corp.  
41 Ledin Drive  
P.O. Box 245  
Avon, MA 02322-0245

**Subject: MWRA Construction Contract 6840**  
**Non-Conformance Report No. 2- CIPP Lining Repairs**  
**Liner Repair Inspection Observations**

Dear Mr. D'Allessandro:

In accordance with Non-Conformance Report No. 2 and subsequent meetings held with D'Allessandro Corp., Insituform Technologies, Inc. (ITI), the MWRA, and Jacobs Civil Inc., we have completed an internal inspection of the repaired CIPP liner on October 28 and 29, 2003. Our observations indicate the liner with the repairs made to it does not meet the Contract Document requirements and is therefore unacceptable at this time.

The following list of items documents our general and specific observations of the installed CIPP liner and the repairs made to it. Based on this information, D'Allessandro Corp. should perform additional work as necessary to either replace or repair the defective CIPP liner such that the finished liner meets the Contract Document requirements. All costs associated with performing these repairs, including, but not limited to continued operation of the bypass pumping system, odor control at the Caruso Pump Station, extension of City of Boston street opening permits, final pavement and escalation is the responsibility of D'Allessandro Corp. and shall be provided at no additional cost to the MWRA.

In general, the following observations apply throughout the entire reach:

1. Voids between the CIPP liner and host pipe at the crown were evident as indicated by tapping with a hammer (hollow sound). The depth of these voids needs to be determined as these lead to reduced cross-section and reduced flow capacity of the sewer. Concerns of possible buckling must also be addressed. Repairs to significant voids need to be made.
2. Voids between the CIPP liner and host pipe were evident at various locations above and below spring line as indicated by tapping with a hammer (hollow sound). The depth of these voids needs to be determined as these lead to reduced cross-section and reduced flow capacity of the sewer. Concerns of possible buckling must also be addressed. Repairs to significant voids need to be made.



3. Approximately half of the stained areas were observed leaking. The limits of the leaking areas do not appear to follow a consistent pattern. The active leaking areas need to be repaired.
4. Water infiltration remains evident in several areas with steady flow.
5. Patches of cut samples continue to leak at some locations.
6. Several soft areas in the liner were noted.

These general observations raise concerns regarding the long-term structural integrity of the liner and the ability of the liner to maintain the hydraulic capacity required. The defects remain spread throughout the entire liner reach with no consistent correlation that can be attributed to any one specific cause. Other observations indicate the resin may have settled to the lower positions of the pipe liner, which raises concern of a weakened crown of the pipe that may affect the long-term integrity of the liner.

Specific observations of our inspection are provided below:

#### Station 10+23 to 7+00 of Section 38

1. MH 10+23, Section 38 weeping at 3 locations on the downstream side.
2. 1 cut fin has a gap between the sides of the fin.
3. 1 bung was weeping/dripping and resin adjacent to the bung appeared to have washed out. The term bad bung is used to identify similar observations at other locations noted below.

#### Station 7+00 to 3+80 of Section 38

1. The epoxy at MH 7+00, Section 38 is not complete at the turn under. Need to check for loose epoxy and reapply as necessary.
2. Noted approximately 4 areas of weeping cut fins.
3. MH 3+80 Section 38 weeping. Need to check for loose epoxy coating.

#### Station 3+80 to 0+59 of Section 38

1. MassPort lateral was observed leaking and needs to be grouted.
2. Bad bung located at 7 o'clock position near 0+70, Section 38, where resin appears to have washed out resulting in a depression approximately 3" x 6" below the patch. The depression creates an indentation approximately  $\frac{1}{2}$ " +.
3. Observed approximately 3 areas of weeping cut fins at various locations.
4. 4 grout holes around patch at 277' were not epoxied.
5. MH 0+59 has minor weeping located at base. Need to check for loose epoxy and reapply as necessary.

#### Station 0+59 to 46+52 of Section 38

1. Approximately 10 LF of 1  $\frac{1}{2}$ " fin at 10:00 position.



2. Measured reduced cross section height at 39" and width at 36.25" at a section with notable condensation along crown. This reduced cross section will affect hydraulic capacity of the sewer.
3. Bulges located at 8:00 and 5:00 positions appear to be folds in the liner. The bulges will affect hydraulic capacity of the sewer and may raise concern of structural integrity.

Station 46+52 to 43+31 of Section 37

1. Fin at 9:00 position approximately 10' if just downstream of MH 46+52.
2. Bad bung at 7:00 position approximately midway between manholes.
3. Steady weep on upstream side of MH 43+31.

Station 43+31 to 40+26 of Section 37

1. White epoxy did not set at grout holes located just upstream of MH 40+26.
2. Weeping around base of MH 40+26.
3. End of liner at MH 40+26 needs to be sealed.

Station 40+26 to 37+19 of Section 37

1. Numerous active weeps at cut fins through area.
2. Patch in this area has active weeps that need to be grouted.
3. Several grout holes around patch were not epoxied.
4. Base of MH 37+19 has loose epoxy on walls of riser and at base of manhole. Loose epoxy needs to be removed and epoxy reapplied.

Station 37+19 to 34+20 of Section 37

1. Entire area appears questionable without further investigation. There are numerous pinholes actively weeping within translucent "strips" on either side of crown. No apparent reason for leaking (no patch, no cut fin, etc.). All leaks are located within translucent areas, very different type of leaking than in other areas. Further investigation is required.

Station 34+20 to 30+34 of Section 37

1. Observed scum adhered to side of liner. Appears to be consistency of hardened sap or pitch. Need to confirm this is not caused by CIPP repair or evidence of CIPP liner defect.
2. Leak at lateral needs to be grouted.
3. Bad bung at downstream corner. Area below patch is depressed from what may be washout of resin.
4. MH 30+34 has several areas of missed epoxy at base.

Station 30+34 to 27+17 of Section 37

1. Observed two areas that require grouting.
2. Observed numerous areas of weeping at cut fins, patches, etc.
3. Cross section of liner appears to be reduced through a good portion of this run. Measured 33"W x 35.25"H with a 9'-2" circumference at approximately 100 feet down



stream of MH 30+34. Reduced cross section reaches need to be restored to full cross section.

4. Appeared to be folds of liner in invert.
5. MH 27+17 need to chip out loose epoxy and reapply.

#### Station 27+17 to 24+11 of Section 37

1. 0' to 25' downstream of MH 30+34 observed delaminating polyethylene liner, which may have been an indication of inadequate hydraulic pressure maintained during inversion as indicated by ITI. ITI noted this may have resulted in the liner overheating in this area. The polyethylene appears to have melted and is hanging down from crown. Need to document no structural defect of liner in this reach.
2. Approximately 1 gpm flow at corner of cut sample patch in this area.
3. Need to remove cracked/loose epoxy from base of MH 24+11 and reapply.

#### Station 24+11 to 20+93 of Section 37

1. Weeping observed.

#### Station 20+93 to 18+46 of Section 37

1. Weeping observed.
2. Need to remove flaking epoxy at base of MH 18+46 and reapply.
3. Grout holes at base of manhole need to be epoxied.

#### Station 18+46 to 15+01 of Section 37

1. Weeping observed.
2. Numerous areas of missing epoxy on the underside of the cut manhole ladder rungs at MH 15+01.
3. Leaking at these manhole ladder rungs occurring. Need to stop leaking or confirm no leaking is occurring after rains stop.

#### Station 15+01 to 12+00 of Section 37

1. Waste grout needs to be removed from invert on downstream side of MH 15+01.
2. Bulge in liner observed at 9 o'clock position approximately half way through section. Bulge appears to be 4"+, 9 LF and 9' 9" circumference. Bulge reduces cross section and carrying capacity and needs to be repaired.
3. Observed numerous folds in invert, 5 o'clock and 7 o'clock position through this run.
4. The repaired bulge in this section still bulges out about 3"+, is 10 LF and has a circumference of 9' 8".
5. The bulge repair patch has some air pockets at surface that need to be repaired.
6. There is a leakage observed immediately below bulge patch.

#### Station 12+00 to 8+98 of Section 37

1. Numerous weeps observed.
2. A fold in the liner is located at the 7 o'clock position along the majority of this run.
3. Need to remove loose epoxy from MH 8+98 and reapply.



Station 8+98 to 4+75 of Section 37

1. The repaired bulge continues to bulge approx. 2" out, circumference is 9' 8".
2. There is a "potential" bulge observed downstream of the repaired bulge. It extends into cross section a couple (+) inches.
3. Observed soft strip in crown approximately 8 feet long by 6 inches wide. Water had created bubbles in the PE layer. A cut through PE layer was made and bubbles drained. The area beneath the felt was soft. Cut section continued to have light flow after draining.
4. A second soft area in crown was observed. Similar to area noted above. Located just down stream of area noted above. Foaming water/air mix was observed bubbling out of cut section after water drained.
5. The repair of the cut sample section near MH 4+75 was leaking at joints.
6. Grout holes at the base of MH 4+75 were not epoxied.
7. Two Zurich fittings need to be removed from just upstream of MH 4+75.

The items noted above are not in conformance with the following Contract Document Specification Sections:

- Section 02713-2.01A5, which states "The liner shall be fabricated to a size that, when installed, will neatly fit into the internal shape of the host conduit without wrinkles."
- Section 02713-2.01-A7, which states "The cured liner wall thickness shall be +10% to -5% of the approved design thickness".
- Section 02713-2.01C3, which states "The finished CIPP shall be continuous over the entire length of an insertion run between manholes and be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. The CIPP installation shall be impervious and watertight."
- Section 02713-2.01C4, which states "The inner surface of the CIPP shall be free of cracks and crazing with smooth finish and with an average of not over two pits per square foot. All pits are to be covered with resin to completely cover the inner fabric."
- Section 02713-2.01C5, which states "Any defects which will affect the integrity or strength of the CIPP, shall be repaired or the CIPP replaced to the acceptance of and at no additional cost to the Authority prior to the reinstatement of flows into the pipe."
- Section 02713-2.01C8, which states "The flared ends at the entrance and exit manholes shall be sealed tight to the pipe and manhole wall."
- Section 02713-3.02C9, which states "Any void between the manhole apron and the CIPP liner shall be cleaned and filled with hydraulic grout to prevent accumulation of deposits."
- Section 02713-3.02C10, which states "The CIPP liner shall be sealed at the manholes to provide a watertight connection between the liner and the manholes."



All proposed repairs to the defects noted above using methods not previously submitted and approved shall be submitted by D'Allessandro Corp and approved by the MWRA prior to commencement of work. Upon completion of work, a certification signed by a professional engineer registered in Massachusetts shall be provided by D'Allessandro Corp that states the final installed liner is structurally sound and meets the 50-year life expectancy indicated in the Contract Documents shall be provided by D'Allessandro Corp.

Additionally, documentation on the possible causes of the defects that have become evident in the installed CIPP liner were previously requested and have not been received to date. Please submit this information.

If you have any questions or comments regarding this information, please contact me at 617.742.8060 or Alan Hoddeson at the site trailer at 617.561.7419.

Sincerely,  
JACOBS CIVIL INC.

A handwritten signature in black ink, appearing to read "Paul V. Savard".

Paul V. Savard, P.E.  
Project Manager

/pvs

c: Mike DelPrete, Pat Barrett, Tom Rouleau, Pete Grasso, and Mo Falsafi, MWRA  
Alan Hoddeson and Dennis Doherty, Jacobs